

**WHAT IS CLAIMED IS:**

1. A kit for ultrasonically stimulating cartilage growth, which comprises:  
means for initiating a biological healing response at or adjacent a cartilaginous site;  
an ultrasonic transducer assembly having at least one ultrasonic transducer;  
a placement module configured to be worn by a patient, said placement module being configured to receive said transducer assembly such that when said placement module is worn said at least one ultrasonic transducer is positioned in proximity to the channels;  
an ultrasonic signal generator positioned in said ultrasonic transducer assembly and operative between a signal generating mode and a non-signal generating mode, wherein at said signal generating mode the ultrasonic signal generator emits ultrasonic signals;  
timing means for automatically placing the ultrasonic signal generator from said signal generating mode to said non-signal generating mode after a predetermined period of time; and  
a main operating unit.
2. The kit according to claim 1, wherein the timing means is within the main operating unit and the predetermined period of time is approximately 20 minutes.
3. The kit according to claim 1, further comprising automatic signal driving means for automatically changing at least one signal characteristic of the ultrasonic signals emitted by the ultrasonic signal generator while in said signal generating mode.
4. The kit according to claim 3, wherein said at least one signal characteristic is the average signal intensity of the emitted ultrasonic signals.

5. The kit according to claim 4, wherein said automatic signal driving means automatically changes the signal intensity of the emitted ultrasonic signals from approximately 30mW/cm<sup>2</sup> to approximately 57mW/cm<sup>2</sup> and vice versa.

5 6. The kit according to claim 1, further comprising bio-feedback circuitry for monitoring the condition of the cartilage and for regulating at least one signal characteristic of the ultrasonic signals emitted by the ultrasonic signal generator according to the monitored condition.

7. The kit according to claim 1, wherein the means for initiating the biological healing response includes a drill assembly.

10 8. The kit according to claim 1, wherein the means for initiating the biological healing response includes a laser drill assembly.

9. The kit according to claim 1, wherein the means for initiating the biological healing response includes a scraping assembly.

15 10. The kit according to claim 1, wherein the means for initiating the biological healing response includes a chemical substance for irradiating the cartilaginous site.

11. The kit according to claim 1, wherein the means for initiating the biological healing response includes a trephine.

20 12. The kit according to claim 1, wherein said ultrasonic signal generator includes signal generator circuitry and an internal power source connected to said signal generator circuitry, a display coupled to said signal generator circuitry to display treatment sequence data, and said signal generator circuitry including a processor and means for generating a pulsed RF signal.

13. The kit according to claim 1, further comprising safety interlock means to prevent inadvertent excitation of said at least one ultrasonic transducer.

14. The kit according to claim 1, wherein said placement module includes a locking mechanism which when worn by the patient prevents the patient from bending or extending the limbs.

15. The kit according to claim 1, wherein the placement module is constructed from a conductive material and said at least one ultrasonic transducer is provided on said placement module is electrically coupled to said main operation unit via said conductive material.

16. The kit according to claim 1, wherein the placement module is custom molded for a particular joint of the patient.

17. The kit according to claim 1, wherein at least one ultrasonic transducer includes means for receiving reflected diagnostic data.

18. A method for ultrasonically stimulating a healing response for the regeneration of cartilage comprising the following steps:

initiating a biological healing response at or adjacent a cartilaginous site;

providing a main operating unit having an internal power source coupled to an ultrasonic transducer assembly, said ultrasonic transducer assembly includes at least one ultrasonic transducer, an ultrasonic signal generator and signal generator circuitry therein;

providing a placement module configured to receive said transducer assembly such that when said placement module is secured to a patient's body said at least one ultrasonic transducer is positioned in proximity to the channels;

exciting said at least one ultrasonic transducer to impinge ultrasonic waves towards the cartilaginous site;

providing a timing mechanism for clocking the amount of time said at least one ultrasonic transducer is excited; and

automatically turning off said at least one ultrasonic transducer after said timing mechanism has clocked a predetermined period of time.

19. The method according to claim 18, further comprising the step of providing an automatic signal driving mechanism for automatically changing at least one signal characteristic of the ultrasonic waves emitted by the ultrasonic transducer.

20. The kit according to claim 19, wherein said step of providing said automatic signal driving mechanism for automatically changing at least one signal characteristic automatically changes the signal intensity of the emitted ultrasonic waves from approximately 30mW/cm<sup>2</sup> to approximately 57mW/cm<sup>2</sup> and vice versa.

21. The method according to claim 18, further comprising the step of providing bio-feedback circuitry for monitoring the condition of the cartilage and for regulating at least one signal characteristic of the ultrasonic waves emitted by the ultrasonic transducer according to the monitored condition.

22. The method according to claim 18, wherein the step of initiating the biological healing response includes drilling at least one channel within the bone joint walls at the cartilaginous site.

23. The method according to claim 18, wherein the step of initiating the biological healing response is selected from the group consisting of scraping the cartilaginous site,

applying a chemical substance to the cartilaginous site, and inducing a fracture at the cartilaginous site.

24. The method according to claim 18, further comprising the step of transplanting non-weight bearing cartilage to the cartilaginous site prior to treatment.

25. The method according to claim 18, further comprising the step of transplanting autologous cultured chondrocytes to the cartilaginous site prior to treatment.

26. The method according to claim 18, further including the step of receiving reflected diagnostic data by said at least one ultrasonic transducer.

27. The method according to claim 18, wherein the step of exciting said at least one ultrasonic transducer to impinge ultrasonic waves towards the cartilaginous site causes the regenerated cartilage to integrate with the non-regenerated cartilage present at the cartilaginous site.

28. A method for ultrasonically stimulating a healing response for the regeneration of cartilage comprising the following steps:

initiating a biological healing response at or adjacent a cartilaginous site;  
releasably securing at least one ultrasonic transducer coupled to a signal generator to a band;

affixing the band on a patient such that said at least one transducer is in proximity to an area where the regeneration of cartilage is desired;

exciting said at least one ultrasonic transducer by actuating said signal generator to impinge ultrasonic waves towards the cartilaginous site;

providing a timing mechanism for clocking the amount of time said at least one ultrasonic transducer is excited; and

automatically turning off said at least one ultrasonic transducer after said timing mechanism has clocked a predetermined period of time.

5 29. The method according to claim 28, further comprising the step of providing an automatic signal driving mechanism for automatically changing at least one signal characteristic of the ultrasonic waves emitted by the ultrasonic transducer.

30. The method according to claim 28, further comprising the step of providing bio-feedback circuitry for monitoring the condition of the cartilage and for regulating at least one signal characteristic of the ultrasonic waves emitted by the ultrasonic transducer according to the monitored condition.

10 31. The method according to claim 28, further including the step of:  
connecting said at least one ultrasonic transducer to an operating unit, said operating unit having an internal power source.

32. The method according to claim 28, further including the step of receiving reflected diagnostic data by said at least one ultrasonic transducer.